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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/653,521	09/02/2003	Christopher John Stephenson	020569-03402	3390

22904 7590 07/18/2005

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EXAMINER	
FULLER, BRYAN A	
ART UNIT	**PAPER NUMBER**
3676	

DATE MAILED: 07/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/653,521	STEPHENSON ET AL.	
	Examiner	**Art Unit**	
	Bryan A. Fuller	3676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 14 & 16 - 63* is/are rejected.

7)☒ Claim(s) *15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/19/04,2/7/05*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

JC

DETAILED ACTION

Claim Objections

1. Claim 27 is objected to because of the following informalities: Claim 27 recites the limitation "the organic polymeric" in line 1 of claim 27. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required. The application has been examined as if claim 27 was dependent upon claim 25 instead of claim 26.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 – 3, 6 – 10, 25 – 26, 31, 39, 45, 51 – 53, 56 – 57, and 63 are rejected under 35 U.S.C. 102(b) as being anticipated by Bourne et al (5,964,291).

With respect to claim 1: Bourne et al teaches in column 1, lines 19 – 28 method for treating a well by introducing a proppant/sand control particulate of a porous particulate material having an internal porosity from about 10 to about 75 volume percent.

With respect to claims 2 and 52: Bourne et al teaches in column 1, lines 19 – 28 method for treating a well wherein the porous particulate material is a selectively configured porous particulate material.

With respect to claims 3, 25 – 26, and 53: Bourne et al teaches in column 1, lines 45 – 48 method for treating a well wherein the porous particulate material is a non-selectively configured porous particulate material. More specifically, the porous particulate material is ceramic.

With respect to claims 6 –7, 31 and 56: Bourne et al teaches in column 1, lines 58 – 67 method for treating a well wherein the porous particulate material exhibits crush resistance under conditions as high as 10,000 psi closure stress and more specifically from about 250 to about 8,000 psi closure stress. The reference also teaches the particulate size is between about 200 mesh to about 8 mesh.

With respect to claims 8 and 57: Bourne et al teaches in column 1, lines 39 – 43 method for treating a well wherein the porous particulate material is a suspension of a porous particulate in a carrier fluid.

With respect to claims 9 and 51: Bourne et al teaches in column 2, lines 23 - 30 method for treating a well wherein the porous particulate material has a porosity and permeability such that a fluid may be drawn at least partially into the porous matrix by capillary action.

With respect to claim 10: Bourne et al teaches in column 3, lines 32 – 43 method for treating a well wherein the porous particulate material has a porosity and permeability such that a penetrating material may be drawn at least partially into the

porous matrix using a vacuum and/or may be forced at least partially into the porous matrix under pressure.

With respect to claims 39, 45, and 63: Bourne et al teaches in column 3, lines 49 – 53 method for treating a well penetrating a subterranean formation, comprising introducing into the well particulate of a selectively configured porous particulate a proppant/sand control material, the selectively configured porous particulate material being a porous particulate material manufactured with a non-porous glazing material or treated with a non-porous penetrating layer, coating layer or glazing material such that either: (a.) the apparent density or apparent specific gravity of the selectively configured porous particulate material is less than the apparent density or apparent specific gravity of the porous particulate material; (b.) the permeability of the selectively configured porous particulate material is less than the permeability of the porous particulate material; **or** (c.) the porosity of the selectively configured porous particulate material is less than the porosity of the porous particulate material.

4. Claim 18 is rejected under 35 U.S.C. 102(a) as being anticipated by Youngman et al (6,372,678).

With respect to claim 18: Youngman et al teaches in column 1, lines 59 – 65 method for treating a well penetrating a subterranean formation, comprising introducing into the well a proppant of a selectively configured porous particulate material, the selectively configured porous particulate material being a porous particulate material manufactured with a glazing material or treated with a penetrating layer, coating layer or

glazing material such that the strength of the selectively configured porous particulate material is greater than the strength of the porous particulate material.

5. Claim 19 is rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen et al (5960,878).

6. With respect to claim 19: Nguyen et al teaches in column 4, lines 35 – 60 method for treating a well penetrating a subterranean formation, comprising introducing into the well a proppant of a selectively configured porous particulate material in a non-gelled carrier fluid, the selectively configured porous particulate material being a substantially neutrally buoyant particulate material comprising a composite of a porous particulate material and a non-porous glazing material or a porous particulate material treated with a non-porous penetrating material, coating layer or glazing layer.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 11 – 12, 14, 17, 29 – 30, 58 – 59, and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al in view of Youngman et al.

With respect to claims 11 – 12, 14, 30, and 58 – 59: Bourne et al teaches the features as claimed except for where the porous particulate is coated or penetrated with a liquid resin, plastic, cement, sealant, or binder. More specifically where the coating or

penetrating material is phenol, phenol formaldehyde, melamine formaldehyde, urethane, or epoxy resin. Youngman et al teaches in column 2, lines 1 – 9 the use of a porous particulate material that is coated or penetrated with a liquid resin, plastic, cement, sealant, or binder. More specifically where the coating or penetrating material is phenol, phenol formaldehyde, melamine formaldehyde, urethane, or epoxy resin. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including a porous particulate material that is coated or penetrated with a liquid resin, plastic, cement, sealant, or binder. More specifically where the coating or penetrating material is phenol, phenol formaldehyde, melamine formaldehyde, urethane, or epoxy resin in view of the teachings of Youngman. The motivation to combine these references is in the fact that resin coated particles are used to improve the stability of proppants at high closure stresses.

With respect to claims 17 and 62: Bourne et al teaches the features as claimed except for wherein a coating layer or penetrating material of the selectively configured porous particulate material is a curable resin and further wherein the selectively configured porous particulate material comprises a multitude of coated particulates bonded together. Youngman et al teaches in column 2, lines 13 – 25 a method wherein a coating layer or penetrating material of the selectively configured porous particulate material is a curable resin and further wherein the selectively configured porous particulate material comprises a multitude of coated particulates bonded together. Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to have modified Bourne et al's method by including a coating layer or penetrating material of the selectively configured porous particulate material is a curable resin and further wherein the selectively configured porous particulate material comprises a multitude of coated particulates bonded together in view of the teachings of Youngman. The motivation to combine these references is in the fact that a multitude of coated particulates are used to improve the stability of proppants at high closure stresses.

With respect to claim 29: Bourne et al teaches the features as claimed except for wherein the porous particulate material is a selectively configured porous particulate material having an apparent density from about 1.1 g/cm^3 to about 2.6 g/cm^3; and a bulk apparent density from about 1.03 g/cm^3 to about 1.4 g/cm^3. Youngman et al teaches in column 1, lines 46 – 58 a method wherein the porous particulate material is a selectively configured porous particulate material having an apparent density from about 1.1 g/cm^3 to about 2.6 g/cm^3; and a bulk apparent density from about 1.03 g/cm^3 to about 1.4 g/cm^3. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including a porous particulate material is a selectively configured porous particulate material having an apparent density from about 1.1 g/cm^3 to about 2.6 g/cm^3; and a bulk apparent density from about 1.03 g/cm^3 to about 1.4 g/cm^3 in view of the teachings of Youngman. The motivation to combine these references is in the fact that a multitude of coated particulates are used to improve the stability of proppants at high closure stresses.

9. Claims 5, 32, 34 - 36, 38, 46, and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al in view of Nguyen et al.

With respect to claims 5, 34 - 36, 38, and 55: Bourne et al teaches the features as claimed except for where the porous particulate material is a relatively lightweight and/or substantially neutrally buoyant particle, includes a surfactant, and is introduced into a well. Nguyen et al teaches in column 4, lines 54 – 65 and in column 2, lines 35 – 46 a method where the porous particulate material is a relatively lightweight and/or substantially neutrally buoyant particle, includes a surfactant, and is introduced into a well. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including a porous particulate material is a relatively lightweight and/or substantially neutrally buoyant particle, including a surfactant, and introducing the materials into a well in view of the teachings of Nguyen et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle that includes a surfactant facilitates the impregnation and/or coating of the compound on the particulate.

With respect to claim 32: Bourne et al teaches the features as claimed except for where the coating layer or penetrating material is present in the selectively configured porous particulate material in an amount of from about 0.5 to about 10% by weight of total weight. Nguyen et al teaches in column 4, lines 12 – 17 a method where the coating layer or penetrating material is present in the selectively configured porous particulate material in an amount of from about 0.5 to about 10% by weight of total

weight. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including a coating layer or penetrating material is present in the selectively configured porous particulate material in an amount of from about 0.5 to about 10% by weight of total weight in view of the teachings of Nguyen et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle with this amount of coating facilitates the impregnation and/or coating of the compound on the particulate.

With respect to claim 46: Bourne et al teaches the features as claimed except for wherein the selectively configured porous particulate material is a suspension of the porous particulate material and a porous matrix, and further wherein the suspension, when introduced into the well, forms a fluid-permeable gravel pack in an annular area defined between the exterior of a screen assembly and the interior of the wellbore. Nguyen et al teaches in column 5, lines 19 – 33 a method wherein the selectively configured porous particulate material is a suspension of the porous particulate material and a porous matrix, and further wherein the suspension, when introduced into the well, forms a fluid-permeable gravel pack in an annular area defined between the exterior of a screen assembly and the interior of the wellbore. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including a selectively configured porous particulate material is a suspension of the porous particulate material and a porous matrix, and further wherein the suspension, when introduced into the well, forms a fluid-permeable

gravel pack in an annular area defined between the exterior of a screen assembly and the interior of the wellbore in view of the teachings of Nguyen et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle facilitates the impregnation and/or coating of the compound on the particulate.

10. Claims 4, 16, 24, 47 – 49, 54, and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al in view of Brannon et al (6,364,018).

With respect to claims 4, 16, 54, and 61: Bourne et al teaches the features as claimed except for wherein the apparent specific gravity of the selectively configured porous particulate material is less than the apparent specific gravity of the porous particulate material. Brannon et al teaches in column 3, lines 52 – 58 a method wherein the apparent specific gravity of the selectively configured porous particulate material is less than the apparent specific gravity of the porous particulate material. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including a selectively configured porous particulate material wherein the apparent specific gravity of the selectively configured porous particulate material is less than the apparent specific gravity of the porous particulate material in view of the teachings of Brannon et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle material may eliminate the need for gellation of carrier fluid, thus elimination a source of potential proppant pack and/or formation damage.

With respect to claim 24: Bourne et al teaches the features as claimed except for wherein the porous particulate material has a maximum length-based aspect ratio of equal to or less than about 5. Brannon et al teaches in column 6, lines 37 – 41 a method wherein the porous particulate material has a maximum length-based aspect ratio of equal to or less than about 5. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including a porous particulate material has a maximum length-based aspect ratio of equal to or less than about 5 in view of the teachings of Brannon et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle material may eliminate the need for gellation of carrier fluid, thus elimination a source of potential proppant pack and/or formation damage.

With respect to claims 47 - 49: Bourne et al teaches the features as claimed except for wherein the selectively configured porous particulate material is a porous material having a glazed surface that enhances the ease of multi-phase fluid flow through a particulate pack and enhances the ease of high rate turbulent gas flow through a particulate pack. Brannon et al teaches in column 8, lines 27 – 47 a method wherein the selectively configured porous particulate material is a porous material having a glazed surface that enhances the ease of multi-phase fluid flow through a particulate pack and enhances the ease of high rate turbulent gas flow through a particulate pack. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including

a selectively configured porous particulate material is a porous material having a glazed surface that enhances the ease of multi-phase fluid flow through a particulate pack and enhances the ease of high rate turbulent gas flow through a particulate pack in view of the teachings of Brannon et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle material may eliminate the need for gellation of carrier fluid, thus elimination a source of potential proppant pack and/or formation damage.

11. Claims 20 – 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al in view of Brannon et al.

With respect to claim 20: Nguyen et al teaches the features as claimed except for wherein the non-gelled carrier fluid contains a friction reducer. Brannon et al teaches in column 2, lines 2 – 15 a method wherein the non-gelled carrier fluid contains a friction reducer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Nguyen et al's method by including a the non-gelled carrier fluid that contains a friction reducer in view of the teachings of Brannon et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle material may eliminate the need for gellation of carrier fluid, thus elimination a source of potential proppant pack and/or formation damage.

With respect to claim 21: Nguyen et al teaches the features as claimed except for wherein the apparent specific gravity of the selectively configured porous particulate material is less than the apparent specific gravity of the porous particulate material.

Brannon et al teaches in column 3, lines 52 – 58 a method wherein the apparent specific gravity of the selectively configured porous particulate material is less than the apparent specific gravity of the porous particulate material. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Nguyen et al's method by including a selectively configured porous particulate material wherein the apparent specific gravity of the selectively configured porous particulate material is less than the apparent specific gravity of the porous particulate material in view of the teachings of Brannon et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle material may eliminate the need for gellation of carrier fluid, thus elimination a source of potential proppant pack and/or formation damage.

With respect to claims 22 and 23: Nguyen et al teaches the features as claimed except for wherein the well is a horizontal or is a deviated well having an angle with respect to the vertical of between about 0 degrees and about 90 degrees and more specifically between about 30 degrees and about 90 degrees. Brannon et al teaches in column 2, lines 34 – 44 a method wherein the well is a horizontal or is a deviated well having an angle with respect to the vertical of between about 0 degrees and about 90 degrees and more specifically between about 30 degrees and about 90 degrees. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Nguyen et al's method by using it to treat a well that is horizontal or is a deviated well having an angle with respect to the vertical of between about 0 degrees and about 90 degrees and more specifically between about

30 degrees and about 90 degrees in view of the teachings of Brannon et al. The motivation to combine these references is because the relatively lightweight and/or substantially neutrally buoyant particle material may eliminate the need for gellation of carrier fluid, thus elimination a source of potential proppant pack and/or formation damage.

12. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al and Nguyen et al as applied to claim 5 above, and further in view of Brannon et al.

With respect to claim 50: Bourne et al and Nguyen et al teach the features as claimed except for wherein the porous particulate material is a substantially neutrally buoyant particle and is introduced or pumped into the well as a suspension in a storage fluid wherein the density of the storage fluid and porous particulate material is of near or substantially equal density. Brannon et al teaches in column 1, line 58 - column 2, line 15 a method wherein the porous particulate material is a substantially neutrally buoyant particle and is introduced or pumped into the well as a suspension in a storage fluid wherein the density of the storage fluid and porous particulate material is of near or substantially equal density. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the combination of Bourne et al and Nguyen et al's method by including a porous particulate material is a substantially neutrally buoyant particle and is introduced or pumped into the well as a suspension in a storage fluid wherein the density of the storage fluid and porous particulate material is of near or substantially equal density in view of the teachings of Brannon et al. The motivation to combine these references is because the relatively

lightweight and/or substantially neutrally buoyant particle material may eliminate the need for gellation of carrier fluid, thus elimination a source of potential proppant pack and/or formation damage.

13. Claims 13 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al in view of Arnold (4,078,610).

With respect to claims 13 and 60: Bourne et al teaches the features as claimed except for wherein the selectively configured porous particulate material is penetrated with nylon, polyethylene or polystyrene or a combination thereof. Arnold teaches in column 7, lines 5 – 15 a method wherein the selectively configured porous particulate material is penetrated with nylon, polyethylene or polystyrene or a combination thereof. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including the selectively configured porous particulate material is penetrated with nylon, polyethylene or polystyrene or a combination thereof in view of the teachings of Brannon et al. The motivation to combine these references is that a substantial reduction in friction loss is achieved.

14. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al and Nguyen et al as applied to claim 32 above, and further in view of Arnold.

With respect to claim 33: Bourne et al and Nguyen et al teach the features as claimed except for wherein the coating layer of the porous particulate material is from about 1 to about 5 microns. Arnold teaches in column 7, lines 5 - 15 a method wherein the coating layer of the porous particulate material is from about 1 to about 5 microns.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the combination of Bourne et al and Nguyen et al's method by including a porous particulate material wherein the coating layer of the porous particulate material is from about 1 to about 5 microns in view of the teachings of Brannon et al. The motivation to combine these references is that a substantial reduction in friction loss is achieved.

15. Claims 40 – 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al in view of Todd et al (6,311,773).

With respect to claims 40 - 42: Bourne et al teaches the features as claimed except for wherein the selectively configured porous particulate material is introduced into the well with a liquefied gas or foamed gas carrier fluid where the liquefied gas or foamed gas carrier is nitrogen or carbon dioxide. Todd et al teaches in column 7, lines 3 – 12 a method wherein the selectively configured porous particulate material is introduced into the well with a liquefied gas or foamed gas carrier fluid where the liquefied gas or foamed gas carrier is nitrogen or carbon dioxide. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including the selectively configured porous particulate material is introduced into the well with a liquefied gas or foamed gas carrier fluid where the liquefied gas or foamed gas carrier is nitrogen or carbon dioxide in view of the teachings of Brannon et al. The motivation to combine these references is that the carrier fluids quickly break into a thin fluid and allows the proppants to better contact the fracture.

16. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al and Nguyen et al as applied to claim 14 above, and further in view of Todd et al.

With respect to claim 37: Bourne et al and Nguyen et al teach the features as claimed except for wherein the gas is nitrogen or carbon dioxide. Todd et al teaches in column 7, lines 3 – 12 a method wherein the gas is nitrogen or carbon dioxide. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the combination of Bourne et al and Nguyen et al's method by including a gas that is nitrogen or carbon dioxide in view of the teachings of Brannon et al. The motivation to combine these references is that the carrier fluids quickly break into a thin fluid and allows the proppants to better contact the fracture.

17. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al in view of Schutze et al (3,149,674).

With respect to claim 27: Bourne et al teaches the features as claimed except for wherein the porous particulate material is an organic polymeric material is a polyolefin. Schutze et al teaches in column 1, lines 19 – 54 a method wherein the porous particulate material is an organic polymeric material is a polyolefin. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Bourne et al's method by including the porous particulate material that is an organic polymeric material is a polyolefin in view of the teachings of Schutze et al. The motivation to combine these references is that the particulate allows extremely hard formations to be fractured and maintained open.

18. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al and Youngman et al as applied to claim 12 above, and further in view of Ramesh et al (US 2003/0050432 A1).

With respect to claim 28: Bourne et al and Youngman et al teach the features as claimed except for wherein the coating layer or penetrating material is an ethyl carbamate-based resin. Ramesh et al teaches in paragraphs [0059] and [0060] a method wherein the coating layer or penetrating material is an ethyl carbamate-based resin. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the combination of Bourne et al and Youngman et al's method by including a coating layer or penetrating material that is an ethyl carbamate-based resin in view of the teachings of Ramesh et al. The motivation to combine these references is that the ethyl carbamate-based resin improves resistance to chipping.

19. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bourne et al and Todd et al as applied to claim 40 above, and further in view of Irani.

With respect to claims 43 and 44: Bourne et al and Todd et al teach the features as claimed except for wherein the liquefied gas or foamed carrier fluid is a mixture of liquid carbon dioxide and nitrogen. Irani teaches in column 3, lines 39 - 49 a method wherein the liquefied gas or foamed carrier fluid is a mixture of liquid carbon dioxide and nitrogen. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the combination of Bourne et al and Todd

et al's method by including a liquefied gas or foamed carrier fluid is a mixture of liquid carbon dioxide and nitrogen in view of the teachings of Irani. The motivation to combine these references is that the liquefied gas or foamed carrier fluid will lower the viscosity of the mixture.

Allowable Subject Matter

20. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan A. Fuller whose telephone number is (571) 272-8119. The examiner can normally be reached on M - Th 7:30 - 5:00 and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian E. Glessner can be reached on (571) 272-6843. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian E. Glessner
Supervisory Patent Examiner
Art Unit 3676

baf